

MY NASA DATA Lesson:

Atmospheric Pressure vs. Elevation

Purpose:

To use NASA satellite measurements of atmospheric pressure to learn that pressure decreases with height in the atmosphere

Grade Level: 6

Estimated Time for Completing Activity:

50 minutes

Learning Outcomes:

- Students will gain a better understanding of the definition of atmospheric pressure.
- Students will become more familiar with using computer resources for data collection.
- Students will gain experience in finding locations and features on a map or atlas.

Prerequisite

- Introduction to Atmospheric Pressure
- Familiarity using the Internet to find data resources

Tools

- Computer with Internet access
- Topographic Map or Atlas

Vocabulary:

- [atmosphere](#)
- [atmospheric pressure](#)

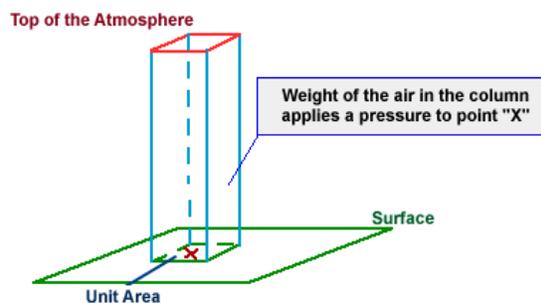


Image courtesy University of Illinois
WW2010 Project

- [elevation](#)
- [sea level](#)
- [topographic map](#)

Lesson Links:

- [Tutorial on Atmospheric Pressure](#)
- [Live Access Server Basic Edition](#)
- [NASA on Air Pressure](#)
- [NASA on Air Pressure](#)
- [Table of Values for Pressure vs Elevation](#)
- [University of Illinois info about Air Pressure](#)
- [A Few other Exercises on Air Pressure](#)
- [Table of Values for Pressure vs. Elevation](#)

Background:

The atmospheric pressure at your location is simply the downward force or weight of the atmosphere (layer of air molecules) above you. If you are standing at a high elevation, like on a mountain top, then there is less atmosphere above you than if you are standing at the beach (sea level). Thus, a weather station at a high elevation would consistently record lower atmospheric pressure than weather stations at sea level.

When weather forecasters want to create maps of atmospheric pressure showing areas of high (H) and low (L) pressure, they must first remove this effect of elevation. That is, they must adjust all station pressure measurements to sea level in order to make comparisons, or see changing pressure patterns that indicate storms or fair weather. However, in this lesson, you will be exploring NASA satellite data products of surface pressure that have not been adjusted. This allows you to compare the pressure data to topographic features on a map or atlas to clearly see that atmospheric pressure decreases with height in the atmosphere.

Procedure:

1. Go to MY NASA DATA website, Click on DATA ACCESS.
2. Go to Live Access Server (Basic Edition). You can also use the Lesson Link above for steps 1 and 2.

3. Select Atmospheric Pressure, and then Monthly Surface Pressure.
4. At the top of the map to the left click on the double downward arrows to choose your continent of interest.
5. Select any time range from the drop down menu below the map in the upper left of the screen (all dates will be similar).
6. Click 'Update Plot' to view the map.
7. Compare the data contours to your topographic map or atlas. Answer the questions below.

Questions:

1. How does your data map compare to your relief map?
2. Can you locate any mountain ranges or other topographic features?
3. Pick two locations by latitude and longitude that are high and low areas. Compare the pressure and elevation measurements. How are they different?
4. Discuss how the data proves that pressure decreases with height.

Extensions:

1. Use Internet or textbook resources to find out how to adjust atmospheric pressure for elevation effects (mathematically bring to sea level pressure).
2. Use Internet resources to find the weather station nearest you. Determine the station's elevation. Examine the record of atmospheric pressure over time.

Lesson plan contributed by Richard Choate, Rochester, New Hampshire

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